

Focal Plane Development for the Transition-Edge EBIT Microcalorimeter Spectrometer

Completed Technology Project (2014 - 2018)



Project Introduction

I propose to produce the first fully operational 1000-pixel X-ray Transition-Edge Sensor microcalorimeter imaging spectrometer system, and to deliver it to the Electron Beam Ion Trap (EBIT) facility at Lawrence Livermore National Laboratory. This spectrometer will serve as a prototype for the microcalorimeter array on a future large X-ray observatory, and its use in a laboratory on the ground will aide in the optimization of analysis procedures for future data. Furthermore, I will make laboratory astrophysics measurements using this spectrometer at the EBIT that will be critical for understanding the atomic physics and resulting X-ray spectra that a upcoming large-aperture mission will yield. TES X-ray microcalorimeters, with their unprecedented energy resolution, quantum efficiency, and timing, exemplify the cutting edge innovation and technology development that maintains NASA's world leadership in this field. My proposed work aligns with the goals laid out in the 2012 NASA Technology Roadmap for science instruments, as well as the priorities decided upon by the astronomical community in the 2010 Decadal Survey in Astronomy and Astrophysics.

Anticipated Benefits

TES X-ray microcalorimeters, with their unprecedented energy resolution, quantum efficiency, and timing, exemplify the cutting edge innovation and technology development that maintains NASA's world leadership in this field. My proposed work aligns with the goals laid out in the 2012 NASA Technology Roadmap for science instruments, as well as the priorities decided upon by the astronomical community in the 2010 Decadal Survey in Astronomy and Astrophysics.



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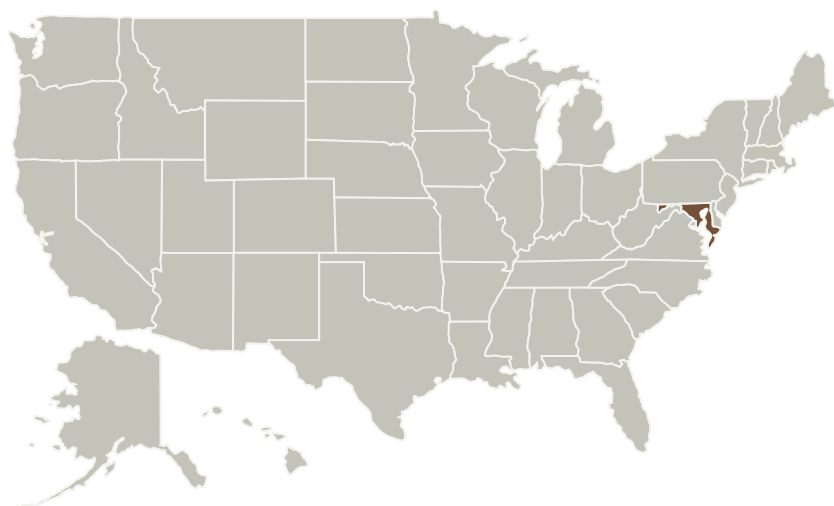
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Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
University of Maryland-College Park(UMCP)	Lead Organization	Academia Asian American Native American Pacific Islander (AANAPISI)	College Park, Maryland

Primary U.S. Work Locations

Maryland

Project Website:

<https://www.nasa.gov/directorates/spacetech/home/index.html>

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

University of Maryland-College Park (UMCP)

Responsible Program:

Space Technology Research Grants

Project Management

Program Director:

Claudia M Meyer

Program Manager:

Hung D Nguyen

Principal Investigator:

Christopher S Reynolds

Co-Investigator:

Gabriele L Betancourt-martinez

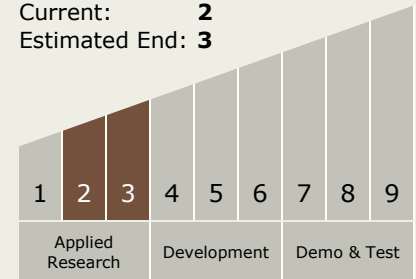
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Technology Maturity (TRL)

Start: **2**
Current: **2**
Estimated End: **3**



Technology Areas

Primary:

- TX08 Sensors and Instruments
 - └ TX08.1 Remote Sensing Instruments/Sensors
 - └ TX08.1.1 Detectors and Focal Planes

Target Destination

Outside the Solar System